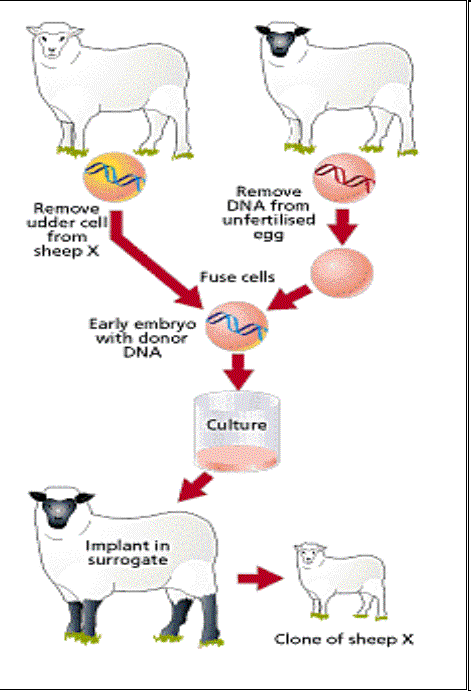
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**Genetic Technology Web Quest**

Ms. Ottolini, Pre-AP Biology, 2012-2013’

***Directions:*** *Use the links provided below or on the Wiki page to access each video / animation / web site. Answer all questions thoroughly and accurately. You must use COMPLETE SENTENCES.*

**Part A: Whole Organism Cloning**

<http://www.dnalc.org/resources/animations/cloning101.html>

1. What is a clone?
2. What are two types of “natural” clones?
3. Before 1996, what did scientists believe was the only way to clone an organism? What types of cells had to be used?
4. What is cell differentiation? How is it possible if all cells have the same DNA?
5. Why did the scientists at Roslin Institute grow sheep udder cells under starvation conditions?
6. What did scientists do to the egg cell before inserting the donor nucleus from the udder cell?
7. How could scientists be certain that the baby sheep was a clone of the nucleus donor?

**Part B: Human Genome Project**

<http://www.ornl.gov/sci/techresources/Human_Genome/project/about.shtml>

1. Identify two goals of the Human Genome Project.



1. Click “The Science Behind the Human Genome: Understanding the Basics.” How many base pairs are found in the human genome? How many genes?
2. Explain how the human genome compares with the genomes of other organisms.
3. How can the Human Genome Project be used?

**Part C: DNA Fingerprinting**

<https://www.youtube.com/watch?v=DbR9xMXuK7c>

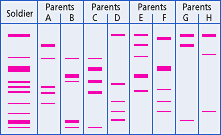
1. Why are human genes (regions of the DNA that code for proteins) so similar between individuals but non-coding regions are so different?
2. What are STR’s (Short Tandem Repeats)?
3. Place the events of DNA fingerprinting in the correct order:

\_\_\_\_\_Place DNA from each individual in wells (aka holes) one end of a gel made of a mesh-like substance called agarose.

\_\_\_\_\_Since DNA is negatively charged, the DNA fragments from each well move toward the positive end of the gel. Smaller fragments move more quickly through the gel, and end up farther from the wells.

\_\_\_\_\_Run an electrical current through the gel such that the well-end is negatively charged and the opposite end is positively charged.

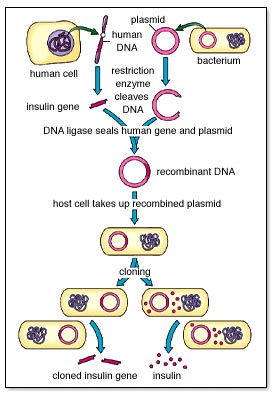
\_\_\_\_\_Use molecules called restriction enzymes to cut STR’s at various sequences of nitrogen bases (A,T,C, and G’s) to create DNA fragments that are different sizes for each individual



1. In what situations might DNA fingerprinting be a useful technology?
2. In the diagram to the right, which parents’ DNA matches the soldier’s DNA? Explain your answer.

**Part D: Recombinant DNA**

<https://www.youtube.com/watch?v=PejmqpBatuw>

1. Define the term “recombinant DNA.”
2. Provide an example of recombinant DNA technology use in crop production.
3. Provide an example of recombinant DNA technology use in human health sciences.
4. Describe the steps taking place in the image to the right. (We will discuss this as a class).

***Important Vocabulary:***

* Plasmid: a small circle of DNA found in bacteria
* Restriction Enzymes: Enzymes used to cut the plasmid and human insulin gene.
* DNA Ligase: an enzyme used to “glue” the human insulin gene into the plasmid